Liberty Power	METERING NARRATIVE	GREAT BAY SOLAR I LLC
	GREAT BAY SOLAR I & II	October 23, 2019

1 Introduction

Great Bay Solar is a 150MWac solar facility located in Princess Anne, MD. The facility comprises several different PV sites and one shared 150MWac interconnection substation. The facility is split into 3 distinct projects each with their own energy offtaker. Great Bay Solar I, LLC (GBS I) is a 75MWac facility, has a Power Purchase Agreement with U.S. General Services Administration (GSA), and consists of 4 PV sites which reached COD under the PPA in March 28, 2018. Great Bay Solar II, LLC (GBS II) is a 42 MWac facility, will be sold under a hedge agreement (to be determined), consists of 1 PV site and has an interconnection COD of Dec 2020. Due to the shared 150MWac interconnection substation there are DPL owned revenue meters at the HV side of the main power transformer. This metering narrative will set out the calculations needed to properly settle the energy amounts generated by the individual projects.

2 Primary Metering

Primary revenue metering is performed on the 138kV side of the T1 main power transformer at the Great Bay Solar 150 MWAC substation using redundant DPL-owned ION8650s. These meters, DPL Revenue Meter 1 & DPL Revenue Meter 2 measure the aggregate power output of both the Great Bay Solar project arrays, post transformer losses. The Point of Interconnection and location of DPL-owned revenue meters are one in the same and therefore there are no transmission line losses. These meters are connected to metering class current transformers (rated 0.3 B1.8) and metering class voltage transformers (rated 0.3WXYZ,ZZ) located on a standalone metering structure.

An SEL-735, Check Meter, provides backup metering to the ION8650s. Should the ION8650s fail, the SEL-735 will provide revenue information. This meter is connected to metering class current transformers (rated 0.3 B1.8) located on the T1 transformer 138kV bushings and metering class voltage transformers (rated 0.3WXYZ) located on a standalone voltage transformer structure, VT1.

See drawing 002-01 for meter locations.

All meters follow ANSI C12.20-2015 standard for electrical metering. All instrument transformers follow ANSI C57.13-2016 standard for instrument transformers.

All meters are time synchronized using an SEL-2401 GPS satellite clock through the RTAC and over IRIG.

3 Feeder Metering

On the 34.5kV bus feeders 52F1, 52F2 and 52F3 collect MWac output from GBS I and are not metered. Feeder 52F4 will collect MWac output from GBS II. Feeder 52F4 will be metered by a SEL-735 revenue meters, numbered M-F4. This meter separately determine the power generated by GBS II's solar array, prior to any transformer losses. This meters is connected to metering class current transformers (rated 0.3 B1.8) located on the 34.5kV feeder breakers and metering class voltage transformers (rated 0.15WXMY) located on the 34.5kV bus.

See drawing 002-02 for feeder meter locations.

All meters follow ANSI C12.20-2015 standard for electrical metering. All instrument transformers follow ANSI C57.13-2016 standard for instrument transformers.

All meters are time synchronized using an SEL-2401 GPS satellite clock through the RTAC and over IRIG.

4 Transformer Losses

To determine transformer losses, the data collected at the primary meter will be compared to the check meter and feeder meter 52F4 to determine the total losses across the transformer, T1.

Transformer losses as determined below shall be allocated to the two generating projects on a pro-rated basis according to their relative power contributions.

Since load losses are proportional to the square of the current and power flow, the losses cannot be proportionally split by the ratio of power produced by each solar array. Instead, when calculating the losses, the square of the current flow will need to be used to properly proportion the losses between each feeder.

Example:

Check Meter reads 1958A. Feeder 52F4 produces 703A. The balance of current 1255A is therefore produced by Feeders 52F1, 52F2 & 52F3.

Percent losses attributed to GBS I (feeders 52F1, 52F2 & 52F3) : $1255^2 / (1255^2 + 703^2) = 76\%$

Percent losses attributed to GBS II (feeder 52F4) : $703^2 / (1255^2 + 720^2) = 24\%$

The difference in power produced by the solar arrays may vary hour to hour. Therefore, metered values will need to be obtained after the fact on an hourly basis to properly determine the compensations and allocations for each.

Station service power will be drawn from the 34.5kV bus. Due to location of the station service transformer, close to the GSU transformer, the station service power draw can be considered as transformer losses for the purpose of these calculations.

The meters will not be set to calculate transformer losses.

This calculation will be performed by Customized Energy Solutions who under a Professional Services Agreement provides the settlement services for GBS I and will be set-up for GBS II. CES receives the full facility monthly settlement amounts from PJM and they will then allocate the pro-rated monthly settlement amount to each of the offtakers' Transaction Managers. See Section 6, 7 & 8 for further details on Transaction Managers.

GBS I & II will have access to all metering data and calculations over SCADA could also be performed in the RTAC to aide in verification of settlement data.

5 Utility Power Consumption

In the event that no power is being generated by any solar array and power is being drawn from the utility, the primary revenue meter should be used to determine the amount drawn and divided proportionally amongst GBS I & II equal to the array size. The power losses calculated above do not apply in this scenario since no power is being generated by the plants.

This calculation will be performed within the RTU and the programming for this calculations will be completed in phase 2 of the project.

6 Great Bay Solar I, LLC: CES & GSA's Transaction Manager(s)

Background

Great Bay Solar I has a PPA agreement with GSA to sell 100% of energy generation to GSA based on a PPA rate of $50.50. Direct Energy, being a supplier of the GSA retail load, has been designated by GSA as the "Transaction Manager" and thus has a PJM account (Direct Energy is a PJM Market Participant). PJM, by way of a bi-lateral arrangement, transfers physical power to Direct Energy account.

Direct Energy, on behalf of GSA, compensates Great Bay Solar I for the power received based on the PPA rate (volume * PPA rate). PJM, on behalf of Great Bay Solar I, credits Direct Energy as per the hourly DA LMP (monthly sum of hourly generation * hourly PJM DA LMP). AES Front Office/ CES is in charge of the scheduling and bidding activities and thus PJM credits/charges Great Bay Solar I for any imbalances (RT LMP vs DA LMP)

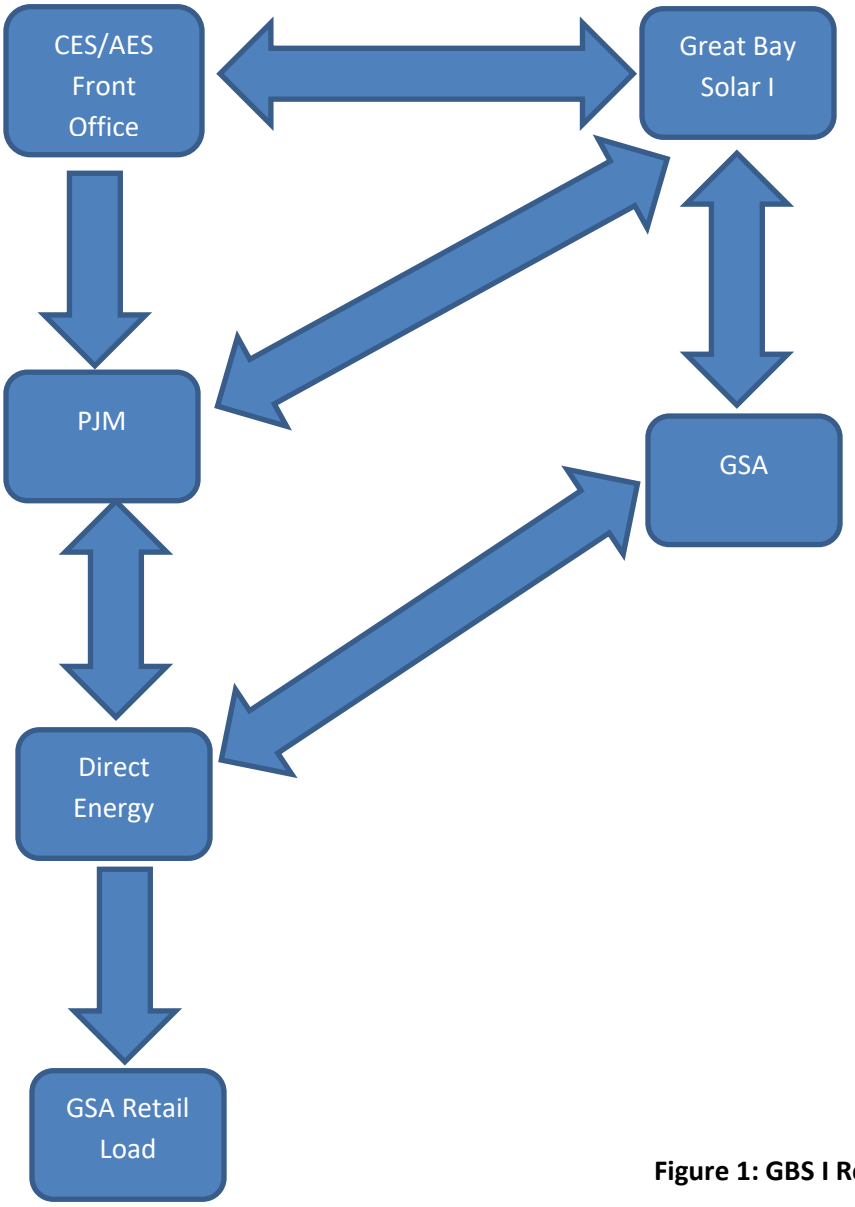

Figure 1: GBS I Relationships

7 Great Bay Solar II, LLC: CES & [Hedge Company]'s Transaction Manager

To be determined.